



# IOCH

## Immunization and Other Child Health Project

**Vaccination Coverage Survey of the  
Sirajganj Municipality – July 2000**

**Survey Report No. 26**

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## **Acronyms**

BCC	Behavior Change Communication
BCG	Bacillus of Calmette and Guerin
CES	Coverage Evaluation Survey
COSAS	Coverage Survey Analysis System
DPT	Diphtheria, Pertussis and Tetanus
EPI	Expanded Program on Immunization
IOCH	Immunization and Other Child Health
Mahallah	Smaller localities (smaller than a village)
MOHFW	Ministry of Health and Family Welfare
Mouza	Smallest administrative locality in an Upazila
MSH	Management Sciences for Health
NGO	Non Governmental Organization
NID	National Immunization Day
OPV	Oral Polio Vaccine
TT	Tetanus Toxoid
WHO	World Health Organization

## Terminology

This provides the meaning of some of the more technical terms used in this report and a brief explanation of their use.

**By card:** An immunization given to a child is termed as by card if the date of the dose is entered on an immunization card. Only doses recorded by card are treated as valid data in this survey.

**By history:** Immunization history collected from a parent's recall is termed as by history. Often no date will be mentioned. This information is only included in crude data.

**Crude coverage** rate is calculated from the doses recorded by card and/or by history. It is not ascertained whether the doses were given at the correct age and/or following the correct interval (where applicable). Crude data however, helps us to understand how much additional coverage could be achieved if all vaccines were given at the optimum age for the child and following the optimum interval. It also provides useful information on access to the EPI program and on the operational aspects of the provision of health services.

**Valid coverage** rate is calculated from the vaccinations recorded by card. Valid data includes only the doses of vaccines that were given after the minimum date of eligibility and/or after the minimum interval necessary to be effective and to protect the child. There is no maximum interval for a dose and therefore a dose administered after 52 weeks is still regarded as valid. By comparing crude coverage with valid coverage data of any particular antigen, one can determine how much coverage was lost due to the inability to give vaccine at the appropriate time.

**Invalid doses** are those administered at the wrong age and/or at the wrong interval. Doses administered before the minimum age in the case of DPT/Polio 1<sup>st</sup> doses and Measles vaccine or with less than four weeks interval in the case of DPT or Polio vaccines are classified as "invalid" doses.

The **criteria for a valid dose** used in this survey is the criteria recognized by the Bangladesh EPI program: minimum age for DPT/Polio 1<sup>st</sup> dose - 6 weeks old; minimum DPT/Polio interval - 4 weeks; minimum age for Measles vaccine - 38 weeks old.

**Program access** is measured by the percentage of children surveyed who received DPT 1<sup>st</sup> dose (crude data – by card and history) in the routine immunization session.

**Fully immunized** means the child has received all the doses it requires (BCG, OPV 1-3, DPT 1-3 and measles).

**Missed opportunity** refers to a visit of a child to a vaccination center for a dose that he received. However at that time he was also eligible for another dose of antigen that he did not receive. If the missed dose was provided at a later date, it is a *corrected missed opportunity*. If not, it is an *uncorrected missed opportunity*.

## Executive Summary

### Background

Between July 12 and July 20, 2000, a coverage evaluation survey was conducted by IOCH in Sirajgonj Municipality as a part of ongoing evaluation of EPI program with the following objectives.

### Objectives

The principal objectives of the survey were to assess:

- a) the levels of routine immunization coverage of children (12-23 months);
- b) the levels of TT immunization coverage in women of child bearing age (15-49 years) regardless of their marital status and
- c) the OPV and Vitamin A coverage levels achieved during the seventh NID conducted in April and May 2000.

### Coverage levels for the routine immunization of children

*Access:* 88% of the children received at least one dose of antigen (DPT 1<sup>st</sup> dose in this case) from routine immunization sessions based on crude data (card plus history) and 12% children did not receive a dose of any antigen.

*Crude coverage between 12-23 months:* 87% children received BCG, 74% received three doses of OPV, 73% received three doses of DPT and 67% received measles vaccine. 66% children were fully immunized.

*Valid coverage between 12-23 months:* 87% children received BCG, 71% received three doses of OPV and DPT and 64% received measles vaccine. 54% children were fully immunized.

*Valid coverage by 12 months:* 87% children received BCG, 71% received three doses of OPV and DPT and 64% received measles vaccine. 50% were fully immunized.

*Source of immunization:* Childhood immunization was provided by municipal EPI centers in 51% of the cases, 26% from Government hospitals and the remaining from other sources. EPI vaccination center was within half-an-hour walking distance from client's residence in 99% of the cases.

*Reasons for non-immunization and partial immunization of children:* The main reasons for non-immunization and partial immunization were the lack of knowledge of the parents/caretakers about the importance of immunization and in particular the need to return for the subsequent doses. Some parents cited, 'sickness of the child' and some said, 'injection was too painful', as reasons, for non-compliance to immunization schedule.

*Problems detected:* Access to immunization was not very high in this area There was also a high dropout rate (17% from DPT1 to DPT3 and 24% from DPT1 to Measles vaccine) and a number of invalid doses due to early immunization (3% for DPT1 and 12% for Measles vaccine). Child immunization cards were available in only 33% of the cases and were lost in 47% cases. 20% did not have any card. Only 37% parents could mention correctly the least number of times (i.e. 4 times) needed to visit the immunization sessions to get their children fully immunized.

### **Coverage levels for the routine TT immunization of women**

61% of women of childbearing age (15-49 years) received a first dose of TT. 57% received 2 doses and only 16% received the five doses of TT vaccine. 39% women did not receive any immunization.

*Reasons for non-immunization and partial immunization of women:* The major reason cited for non-immunization was that the women were unaware of the need for immunization (57%). Another 29% women mentioned that there was no provision of TT vaccine when they had their pregnancies. Whereas the major reasons for partial immunization were that they were either unaware of the need for due doses of TT immunization (71%) or the health worker did not specify the date to return for the next dose of TT vaccine (11%).

### **Coverage levels for the seventh NID campaign**

In Sirajganj Municipal areas 97% children received OPV during the first round and 94% during the second round of the seventh NID campaign. 93% of the children received OPV in both the rounds and 98% received in any round of the seventh NID campaign. Vitamin A capsules were given to 94% of the eligible children on the second round of the seventh NID campaign.

The main reasons for not receiving OPV during the NIDs were: (i) religious/social barriers (ii) children were away from home on the NID day (iii) preoccupation of the parents and (iv) unaware of NID campaign.

Health workers (57%), miking (61%), friends and neighbours (21%) and television (21%) were the main source of information of the NID campaign.

### **Suggested solutions**

The survey indicates a need for appropriate information being given to parents / caretakers in an effective way about the importance of each child being fully immunized (before 12 months) and about how to achieve full immunization (the time and place of the immunization sessions and the number of doses required). All women of childbearing age require adequate knowledge about how to prevent tetanus both for themselves and for the new born with 5 doses of TT vaccination.

The poor quality of services, as reflected by the low coverage (66% full immunization for crude data and 50% for valid data by 12 months) and dropout rates (24% for DPT 1 to Measles) could be improved by adequate counseling of mothers. Therefore, there is also a need for training to be given to the service providers to help them keep up to date with EPI policies and guidelines and increase their capacity for counseling parents about EPI.

## **Introduction**

The routine EPI program in the municipalities is carried out by a variety of private and public providers at fixed (hospitals, clinics, dispensaries, etc.) and at outreach sites. NGOs and private practitioners also provide immunization services in many places. The doses of immunization provided are supposed to be reported to the municipal Health authority either at the end of each immunization session (if it is provided by municipality) or on a monthly basis. After compilation, the data is submitted to the concerned Civil Surgeon's office that aggregates it with other Upazila EPI results within that district and sends it on to the EPI Head Quarter in Dhaka.

For many reasons (e.g. immunization provided to children older than the target age group, tendency for over reporting, underestimated target etc.) routine EPI coverage data is generally unreliable<sup>5,7,8</sup>. There are also clear indications that the health situation in most of the urban areas are worse than in the rural areas<sup>5,7,8,10,11</sup>.

IOCH therefore decided to carry out a survey based on the WHO recommended EPI 30 cluster survey method<sup>1</sup> to obtain data on the status of the immunization coverage of the children and women living in the Sirajganj Municipality area as well as on the operational profile of the provision of immunization services. Sirajganj Municipality was taken as an universe and 30 clusters were chosen through random sampling method (please see methodology in the next page).

## **Objectives**

The overall objective of the survey was to assess the level of immunization coverage in Sirajganj Municipal area. The specific objectives were to:

- a) assess the level of routine immunization coverage of the children (12-23 months) and find out the reasons for non immunization and partial immunization
- b) assess the level of TT immunization coverage among women of 15-49 years of age irrespective of their marital status and find out the reasons for non immunization and partial immunization
- c) assess the coverage levels of OPV and vitamin A administered during the seventh NID campaign.

## Methodology

The survey followed the WHO recommended 30-cluster survey method<sup>1</sup>, which has been widely used in many developing countries to assess immunization coverage. It is relatively simple and can be done at low cost. (The detailed survey methodology and its limitations are presented in **Annex A**). Briefly, the immunization information is collected on a randomly selected group of 210 children/women from 30 clusters (7 children/women per cluster) in a given community. It gives an estimate of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect of 2.

In this survey 7 children between 12-23 months (children born between July 12, 1998 to July 11, 1999) were selected from each cluster to ascertain their routine vaccination status. **Annex B** describes how the dates of eligibility of different antigens in routine immunization were determined for children. The seventh NID campaign was conducted on April 23 - May 29, 2000 in two rounds respectively throughout the country including urban areas. Children born between May 29, 1995 and May 28, 2000 were selected for collecting information on NIDs. Seven women between 15-49 years of age, irrespective of their marital status were selected to ascertain their tetanus toxoid vaccination status for routine immunization.

The 30 clusters (mahallahs) were chosen randomly by IOCH from a list of the populations of mouzas and mahallahs in the Bangladesh Population Census 1991. The list of selected clusters is given in **Annex C** and their location is shown on the following map. The WHO standard questionnaire was used in this survey for documenting the routine immunization status of children and women. Separate questionnaires were used for collecting the data on the NID campaign.

Data was collected by the IOCH Survey Team. Data collection period was from July 12 to July 20, 2000. Data entry and analysis was done by IOCH using COSAS 4.41<sup>3</sup> and "EPI Info" programs. The final report was prepared by the Monitoring and Evaluation Unit, IOCH/MSH Project.

## Limitations of the Method

### Limitations of the 30-cluster survey method

Although the 30-cluster survey method is relatively simple, it has several limitations<sup>2</sup> that can be grouped into two types:

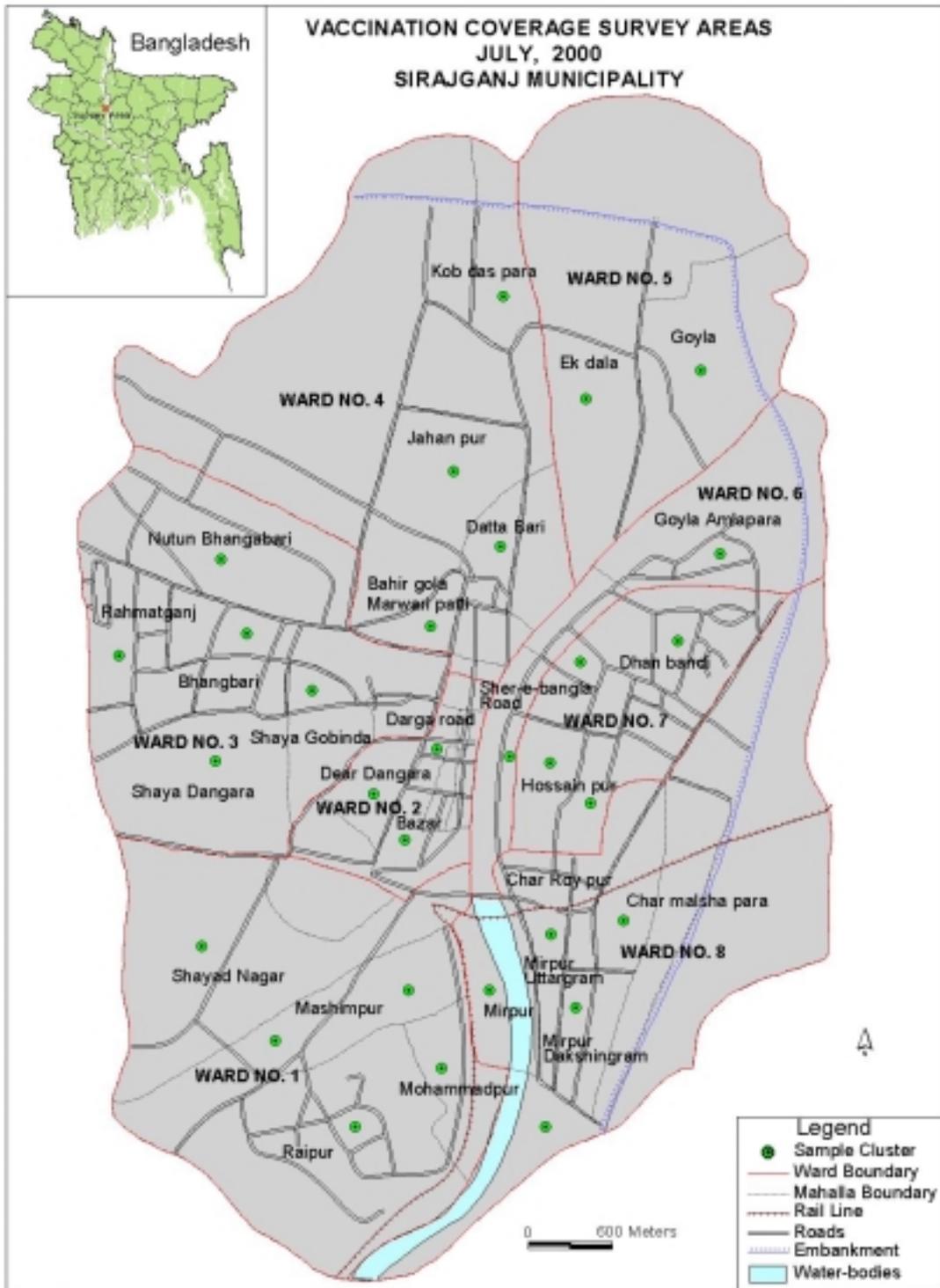
#### Linked to the sampling method:

- As an inherent bias in the sampling technique in 30 clusters, bigger mouzas are more likely to be selected as a cluster. The survey leaves out scattered small mouzas with poor access to services. It also does not reflect the lack of uniformity in service availability or the behavior of particular populations.
- There is a wide confidence interval (+/- 10%). It means that if the result shows 68% of children received a valid dose of measles before 12 months of age, then the “true” figure of measles immunization of children could be anywhere between  $(68-10) = 58\%$  and  $(68+10) = 78\%$ . This type of survey is useful when the coverage is low but is less relevant to assess higher coverage or to compare surveys – unless there is a big difference between two surveys.
- To be relevant the analysis of valid data must apply to a relatively high percentage of available cards.

#### Linked to the implementation:

- The selection of the index house is key. Too often the proper method is not followed because the surveyors do not make the effort to number all the houses from their location to the end of the mouzas along the direction indicated by the bottle or by the pencil.
- If a household includes an eligible child who is not at home for a few hours, the surveyor often does not return later on but skips the house and substitutes another child. This is, of course, an incorrect procedure that introduces a bias.

It is also important to remember that this survey coverage data gives little information about the current program as it documents the activities of a year earlier.



## Results

### A. Routine immunization coverage of children

#### Coverage levels (card plus history data of COSAS analysis)

Table 1 shows the coverage levels of children between 12-23 months and their vaccination status at 12 months of age. The crude data figures for the 12-23 month age group indicate that 74% of the children received three doses of OPV, 73% received three doses of DPT and 67% were vaccinated against measles and 66% children were fully immunized. However, valid coverage levels were slightly lower than those of the crude data, except for fully immunized children. Only 71% of the children received three doses of OPV and DPT, 64% received measles vaccine and 54% were fully immunized. In this survey, 12% children had not been immunized at all and were therefore not reached by the routine EPI program. Proportion of fully immunized children under one year of age (valid data) was 50%.

**Table 1: Routine immunization coverage levels of the children**

Name of the vaccine	Coverage 12 - 23 month age group		Coverage by 12 months of age
	Crude data (Access) (%)	Valid data (%)	Valid data (%)
BCG	87	87	87
Polio 1	88	87	87
Polio 2	80	79	79
Polio 3	74	71	71
DPT 1	88	87	87
DPT 2	80	79	79
DPT 3	73	71	71
Measles	67	64	64
Fully immunized	66	54	50
Zero dose	12	-	-

Table 1 shows little/no difference between crude coverage and the valid data of immunization by 23 months age group. It also shows little difference between valid data by 23 months age group and the valid data by 12 months except for full immunization (54% versus 50%).

#### Distance to the immunization center

Immunization centers were located within 10 minutes walking distance in 85% of the cases and in 12% cases it was within half an hour (Table-2). This implies that all the centers were within the reach of the families. 71% walked to the immunization center, 29% used rickshaw as a mode of transport. A very negligible number of cases used other form of transports.

**Table 2: Distance between the child’s home and the vaccination site**

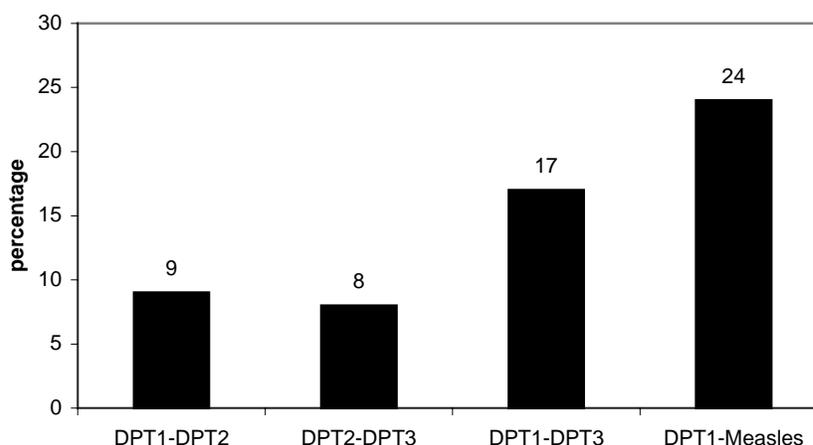
Time (minutes)	Percent
1-5	59
6-10	26
11-30	12

**Program access** [(percent of children surveyed who received DPT 1<sup>st</sup> dose (crude data - by card or history)]. Access to immunization was not very impressive, as only 88% of children received a 1<sup>st</sup> dose of DPT.

**Program continuity** (dropout rate)

Crude data for antigens received by 12-23 months of age is used for calculating the dropout rate. In this survey, the DPT1 to DPT3 dropout rate was 17% and DPT 1 to measles dropout rate was 24% (Chart 1).

**Chart 1: Dropout rates for childhood immunization**



**Program quality**

**Adherence to the immunization schedule – invalid doses**

Adherence to the immunization schedule is generally considered to be the major indicator of program quality. The data indicates providers' performances related to program quality. 3% children received an invalid dose of DPT1 (too early, given before 6 weeks) and 12% received an invalid dose of measles vaccine (too early, given before 38 weeks). Very few children received a DPT second dose less than 4 weeks after the first dose.

**BCG vaccination**

Only 87% children surveyed received BCG vaccine based on crude data (card plus history). 77% children were found with a BCG scar but 11% did not produce a visible scar.

### Missed opportunities of immunization

The uncorrected missed opportunities for immunization was very low (range 0% for DPT3/OPV3 to 1% for BCG) which reflects the program's good performance.

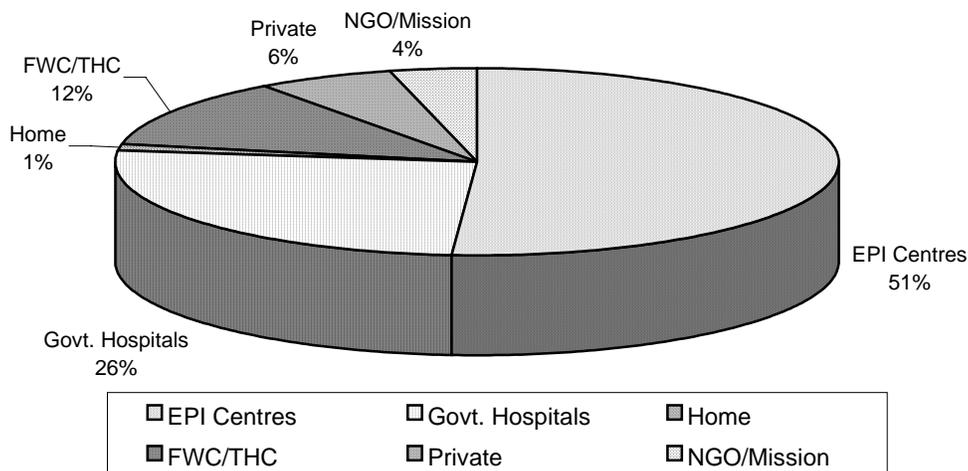
### Availability of documentation of immunization

Child immunization cards were available in only 33% of the cases and were lost in another 47% cases. 20% did not have a card.

### Sources of routine childhood immunization

Childhood immunization was provided by municipal EPI centers in 51% cases, by government hospitals in 26% cases and by FWC/THC in 12% cases. For the rest of the cases immunization was provided from private clinics (6%) or from other places. Others include NGOs/Missions and home (Chart 2).

**Chart 2: Sources of routine childhood immunization**



### Reasons for non-immunization and partial immunization of the children

Out of 210 children, 12% children were not immunized. Parents of 36% of those who were not immunized were not aware about the need of vaccination and 28% thought injection would be too painful for the child. 12% children were sick and were not taken to the vaccination site. Parents were busy with other works in another 12% cases.

Besides, 24% children were partially immunized. The reasons commonly cited by the parents for partial immunization (Table 3) were, unawareness to return for subsequent doses for completion of the series (26%), and unawareness about returning for measles vaccine(10%). 24% did not take the child to the immunization site for sickness. 9% children were away from home.

**Table 3: Reasons for non-immunization and partial immunization of the children**

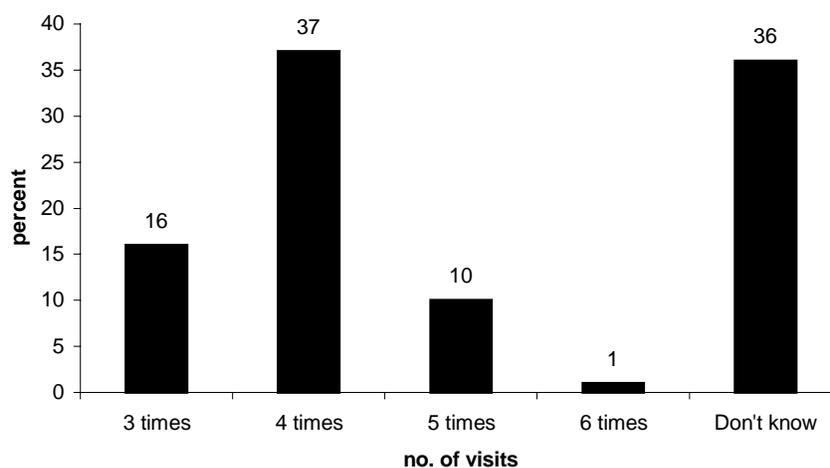
Reasons	Not Immunized (%)	Partially Immunized (%)
Did not know about the need to vaccinate the child	36	2
Mother did not know that she need to return for 2nd/3rd dose	-	26
Did not know she needed to return for Measles vaccine	-	10
No faith in immunization/social and religious barriers	8	-
Time inconvenient/Working parents	4	2
Rumors	-	2
Too busy to take the child to immunization session	12	6
Vaccine was not available in the vaccination site	-	2
Injection too painful	28	8
Any reaction (other than abscess or too much pain) after previous vaccination	-	-
Child was sick and not taken to the vaccination session	12	24
Child was away from home	-	9
Others	-	4

**Information and motivation for routine childhood immunization**

72% parents could mention correct age of completing vaccination series (between 9 and 12 months) and 28% did not know the answer.

On the other hand (chart-3), 37% of the parents could mention correctly the least number of times needed to visit the immunization session to complete vaccination series (i.e. 4 times). However, almost same proportion of parents (36%) did not know the answer.

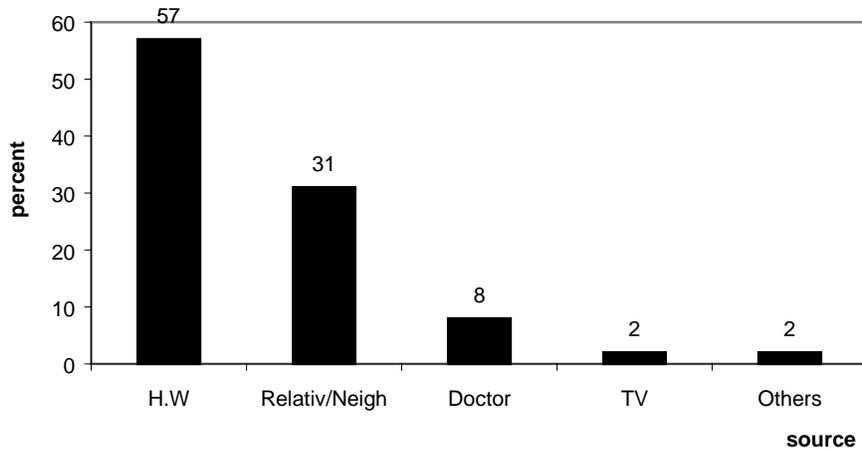
**Chart 3: Parents' knowledge about the number of times required to visit the immunization centre for full immunization of a child**



### Source of information about age of completion of vaccination

Government and municipal health workers informed about 57% of the parents about the age of full immunization of a child (Chart-4). Neighbours and friends informed 31% and physicians advised 8%.

**Chart 4: Source of information about age of full immunization of a child**

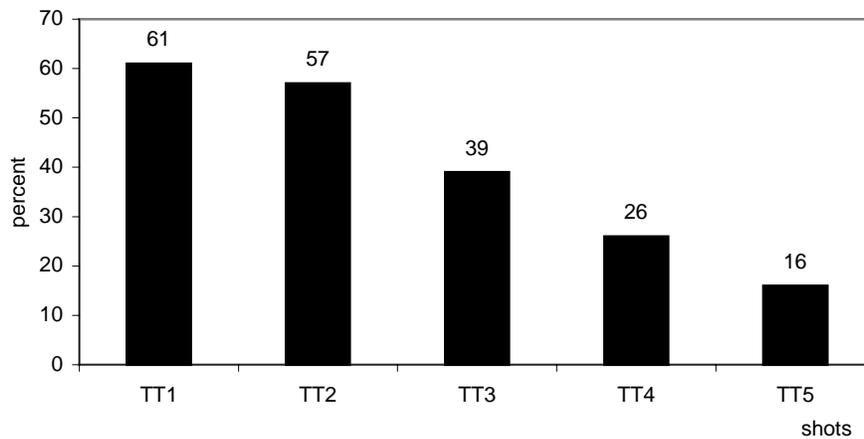


### B. Routine TT immunization coverage levels of the women

#### Coverage levels

61% women had access to a first dose of TT vaccine (based on crude data). 57% received two doses, 16% received all the 5 required doses of TT vaccine (Chart-5) and 39% women surveyed, did not receive any dose.

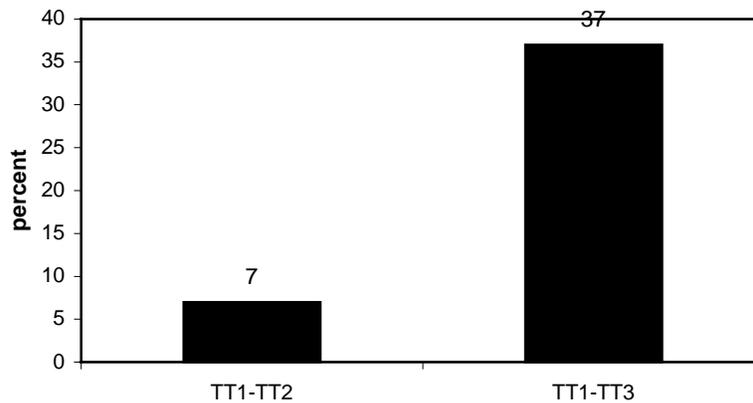
**Chart 5: Routine immunization coverage levels for TT of the women (15-49 years)**



### Dropout rates for TT immunization

The dropout rate from first dose of TT vaccine to second dose was 7% and the dropout rate from first dose of TT vaccine to third dose was 37% (Chart 6). Only 11% women had TT immunization cards and they were lost in another 39% cases. 51% never had a card.

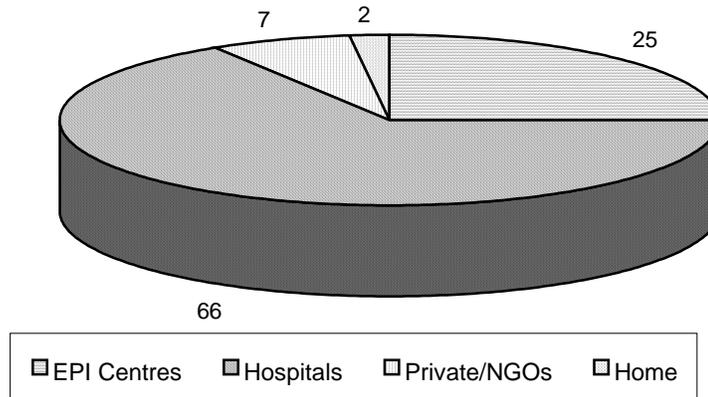
**Chart 6: Dropout rates for TT immunization**



### Sources of TT immunization

Chart 7 shows that 66% TT immunization was provided by government hospitals and 25% was provided from municipal EPI centers. Very few vaccines were provided by NGOs and private clinics.

**Chart 7: Sources of TT immunization**



### Reasons for non-immunization and partial immunization of the women

38% women were not immunized and 44% were partially immunized. Table 4 shows that among the non-immunized women, 57% women were not immunized because they were unaware of the need of immunization and 29% reported that there was no provision of TT vaccine in the public health program when they had their pregnancies. On the other hand, the major reasons cited for partial immunization were: a) unaware of need to return for subsequent doses of immunization (71%) and b) health workers did not specify the date to return for the next dose (11%).

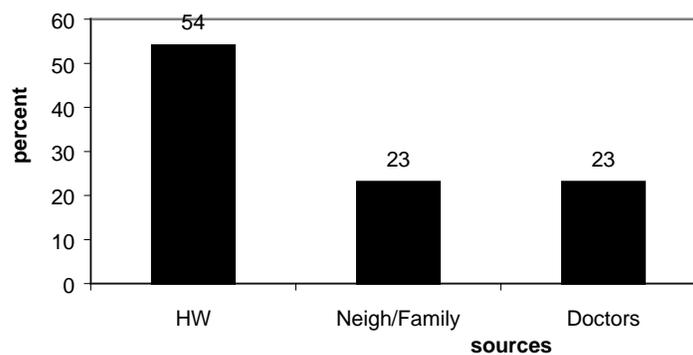
**Table 4: Reasons for non-immunization and partial immunization for TT of the women**

Reasons	Non-immunization (%)	Partial immunization (%)
Next dose is not due yet	-	12
Unaware of need for immunization	57	-
Date to return for next dose was not specified		11
Unaware of need to return for subsequent doses		71
'In our times TT immunization was not in practice'	29	-
Postponed until another time	1	3
Too busy with household chores		2
Place and/or time of vaccination unknown	1	
Fear of taking injection	10	1
Family problem	1	

### Information and motivation for TT immunization

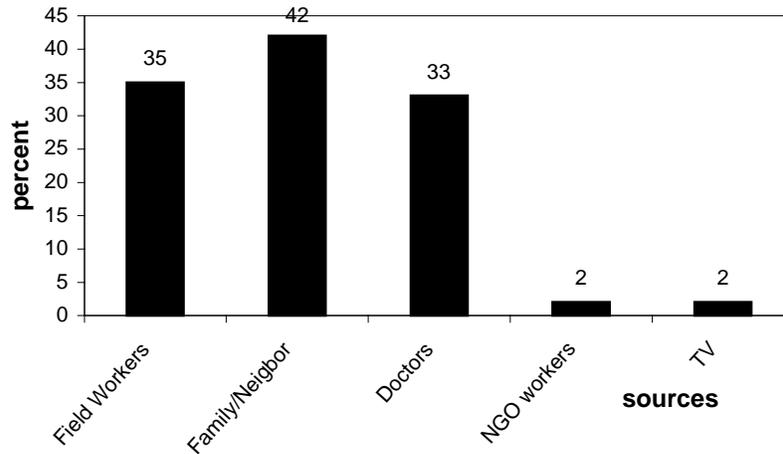
Only 13 (6%) women could mention correctly the number of TT doses required (i.e. five doses) for lifetime protection. 7% women gave a wrong answer and a host of women (87%) did not know that they needed 5 doses of TT for that. Those who answered right, majority of them knew it from the Government or municipal health workers (54%), relatives and neighbors were the source of 23% and physicians advised another 23% (Chart-8).

**Chart 8: Sources of information of number of TT doses required for lifetime protection**



When asked, “Who motivated you for the last dose of TT you took?” 42% replied that they were motivated by relatives/ friends/neighbours. Government and/or municipal health workers motivated 35%, and another 33% were motivated by the physicians (Chart-9).

**Chart 9: Sources of information and motivation for routine TT immunization**

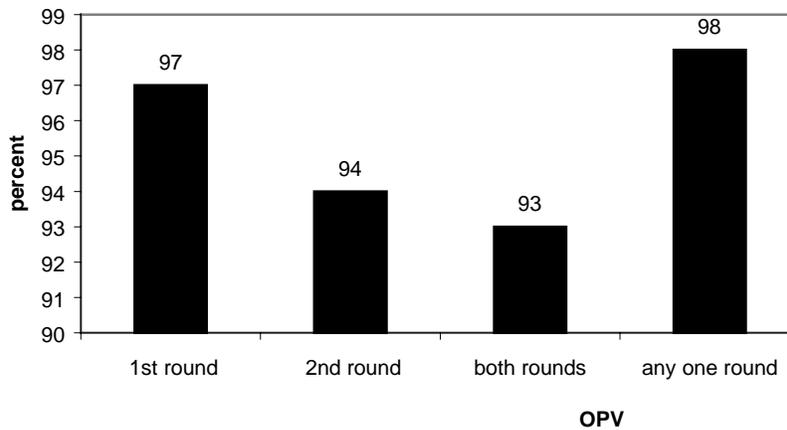


**C. Coverage levels in the seventh NID campaign**

**OPV coverage**

97% children below 5 years of age received OPV during the first round and 94% received during the second round of the seventh NID campaign. 98% children received at least one dose of OPV while 93% received both the doses during the seventh NID campaign (Chart-10).

**Chart 10: Coverage of OPV during the seventh NID**



### High potency Vitamin A coverage

During the second round of the seventh NID campaign a high potency vitamin A capsule was also administered to 94% of the children between one and five years of age.

### Reasons for non-immunization of OPV

Out of 210 children surveyed, 10 children were not vaccinated during first round and 14 children were not vaccinated during second round. The major reasons for not receiving OPV during the first round included: a) religious/social barrier (30%); and b) parents were too busy with other activities (20%).

The reasons for non-immunization during the second round were: a) parents were busy with other activities (29%) b) they were not aware of NID campaign (14%); c) child was away from home (14%); and d) religious/social barrier (7%).

**Table 5: Reasons for non-immunization of OPV during seventh NID campaign**

Reasons	1st round N=10 (%)	2nd round N=14 (%)
Unaware about NID	10	14
Busy for other activities	20	29
Fear of side effects	-	7
Vaccine/vaccinator not available	10	7
Child already vaccinated	-	7
Time inconvenient	10	-
Child away from home	10	14
Waited for home visit	10	
Religious/social barrier	30	7
Others	-	14

### Places of vaccination during the seventh NIDs

Almost all (99%) children received OPV from the NID vaccination sites. Three children in the first round and two children in the second round received vaccines at home during household visit (child- to- child search).

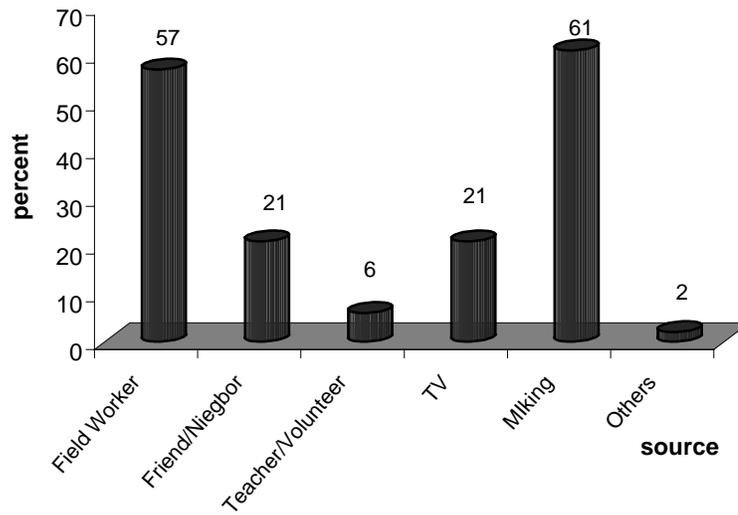
### Distance of NID centers

87% of the NID centers were within 5 minutes distance and the rest (13%) were within 6 to 10 minutes. 97% of the parents went to NID center on foot. 3% went by a rickshaw.

**Source of information about the second round of seventh NID campaign**

61% parents heard the information about the second round of the seventh NID from miking, 57% from the municipal health workers, friends and neighbours informed 21% and another 21% were informed through TV (Chart-11).

**Chart 11: Sources of information about the 2<sup>nd</sup> round, 7th NID campaign**



## Discussion

The survey showed that 88% children of 12-23 months of age had access to routine immunization. There were also high dropout rates (e.g. 17% from DPT1 to DPT3 and 24% from DPT1 to measles vaccine) and a good number of invalid doses (3% for DPT1 and another 12% for measles vaccine). Another 12% children had not been immunized at all.

Moreover child immunization cards were lost in 47% cases and TT immunization cards were lost in 39% cases. The absence of cards has got serious implications as it may mean that when a child comes to the immunization session for the second or subsequent doses, the vaccinators will have to immunize without accurately knowing the date of birth of the child and the date of previous immunization. This is another factor likely to increase the number of invalid doses given. This is also true for TT immunization where there is often a long interval between doses.

Women's correct knowledge about number of times required to visit the immunization centre for full immunization of a child was only 37%. Another 36% women did not know the answer at all. This indicates that parents need more education about childhood immunization.

During NID, 93% received OPV in both rounds and 98% received OPV in any round of the seventh NID campaign. 97% received during the first round and 94% during the second round. Vitamin A coverage was 94%. This indicates that there are areas for improvement especially for vitamin A coverage. It is evident from this survey that the health workers should emphasize on distributing Vitamin A as well. The program should look into the supply issue.

Miking (61%) was the most important source of information of the NIDs in this area, followed by health workers (57%) and friends/neighbours (21%). For another 21% cases, information was delivered by TV. But, effectiveness of printed or electronic media was found to be less effective in the area where survey was conducted.

Although Health Workers were the important source of information for childhood immunization, in case of TT immunization, information was transferred more by neighbours and friends than that of health workers ((42% versus 35%). Physicians also contributed by 33% for giving the knowledge about TT to women.

## **Conclusions and Recommendations**

### **Coverage levels for routine immunization of children**

#### **Access to routine immunization and low full immunization**

This survey found that the access to routine immunization for children in Sirajgonj Municipal areas was not very satisfactory with only 88% of the children receiving a first dose of DPT, which dropped to 73% in case of DPT3. However, this important shortcoming can be mainly attributed to the lack of knowledge on the importance of full immunization leading to dropouts and also to a number of invalid doses. This indicates the poor quality of screening, inadequate knowledge or lack of motivation of the service providers. This situation could be improved by proper screening of eligibility of clients for each antigen at the time of vaccination, and by adequate counseling of mothers by the service providers.

#### **The dropout rates**

The high dropout rates could be reduced to acceptable levels<sup>5,6,9</sup> by:

- providing better counseling to parents/caretakers about the importance of each child receiving all the required antigens before 12 months. They also require advise about when and where they should take their child for the next dose. Most children will need to attend 4 immunization sessions. 26% of the children dropped out because their parents/caretakers did not know that they were required to return to the EPI center for subsequent doses and for measles vaccination (10%). 24% parents did not take their children for immunization as their children were sick. Parents need to be informed that minor illnesses are not a barrier for immunization.
- undertaking appropriate Behavior Change Communication (BCC) activities through the mass media and service providers to increase awareness of the need for children to receive all the doses of each of the antigens.
- providing refresher training and orientation to the service providers for counseling parents. It is apparent from the results of the survey that they lack the relevant technical skills and/or motivation for counseling. Some parents reported that they had never received any immunization information from a health worker and others complained that they had not been spoken to at all.
- emphasizing the need to retain and use vaccination card.

### **Coverage levels for TT vaccination**

Access to TT vaccine was quite low (only 61% for TT1) and the rate of dropout after the second dose was very high (37% from TT1 to TT3). The coverage reduced to only 16% for TT5. However, only 39% women were not immunized at all. 71% were unaware of coming back for subsequent doses. A woman of reproductive age needs to receive 5 doses of TT at appropriate intervals to acquire immunity for rest of her reproductive life. TT coverage is likely to be improved by:

- checking the TT status of all women between 15-49 years at antenatal check ups and at routine child immunization sessions, irrespective of pregnancy status, to see whether the mother or female caretaker is eligible for any dose of TT and provide a dose of TT if it is required
- undertaking appropriate BCC activities to increase awareness of the women of childbearing age of the need for 5 doses of TT vaccinations
- providing refresher training to the service providers of the TT vaccination requirements.

### **Coverage levels for the seventh round of NIDs**

3% children in the first round and 6% children in the second round of the 7<sup>th</sup> NID did not receive OPV. 93% children received OPV in both the rounds and 98% received in at least one round. It still means that there were some children who received only one dose of OPV or were not immunized at all. This occurred at a time when every child under five years old should receive a dose of OPV in each round of NID campaign in order for Bangladesh to achieve its goal of being a polio free country. Improvements might be made by:

- increasing and improving the BCC activities to ensure that each parent/caretaker is aware that each and every child must receive polio vaccine during both rounds of each NID campaign;
- paying particular attention to immunization in remote areas, where there is a shortage of health staff and in those areas known to have low OPV coverage in earlier NIDs.

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## Annex - A

The following are extracts from **Anthony G Turner, Robert J Magnani and Muhammad Shuaib's** article entitled **"A not quick as quick but much cleaner alternative to the Expanded Programme on Immunization (EPI) cluster survey design"** published in the *International Journal of Epidemiology* in 1996, volume 25, Issue No. 1, pages 198-203.

### The standard EPI Cluster Survey Design

"The sample design for the EPI Cluster Survey is a two stage design involving the selection of 30 primary sampling units or 'clusters' (usually village or other area units), from which 210 children with a target age range (usually 12-23 months) are chosen, seven children per cluster. The sample size of 210 children (per domain or stratum) is mandated by the desire to estimate the level of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect (i.e. *deff*) of 2.0. Based upon prior experience with immunization coverage surveys (primarily in the US), 30 clusters are generally thought to be necessary to yield sufficiently reliable estimate."

"In the standard design, clusters are chosen from a list of primary sampling units (i.e. villages, urban communities, census enumeration areas etc.) through systematic random sampling with probability proportional to estimated size (*ppes*). The latest estimates of cluster population sizes, which are assumed to be proportional to the number of children in the target age group in each cluster, are typically used as measures of size. The 30 clusters so chosen are then visited by survey field staff who carry out the second stage of sample selection and conduct the household interviews. "

"The original EPI design called for sample children to be chosen randomly from a list of all eligible children in each sample cluster. However, because the creation of lists of households and children tends to be time consuming, costly, and unfeasible in some settings, this procedure is only infrequently used in actual practice. Instead, one of several simplified second stage sampling procedures is commonly used. In one variant, children are selected by first choosing a random direction from a central location in a village or community (e.g. by spinning a bottle). The number of households in that direction to the edge of the community is then counted, and one household is randomly chosen to be the first sample household. Subsequent households are chosen by visiting the nearest neighboring households until information has been gathered on seven children. In a yet simpler variant, a direction from a central starting point is randomly chosen as described above and households are contacted as the interviewer moves in the chosen direction until the required information has been gathered for seven children."

"The second stage sampling methods described above are 'quota sampling procedures' and some of the problems resulting from the use of this approach have been noted over the years."

"First, quota sampling does not ensure that every eligible member of the target population has a known, non-zero chance of being selected. Hence, the standard EPI design, as it is usually applied, is not a true probability sample design. ...."

"A second problem concern sampling weights. .... However, since measures of size in sampling frames are often inaccurate due to census errors and changes in population since the census was taken, application of the standard EPI Cluster Survey method does not automatically result in a self weighting sample. The survey data must be weighed in order to yield unbiased estimates. .... However, since selection probabilities are not known in most EPI Cluster Survey applications, sampling weights can not be calculated."

"Thirdly, a computer simulation study demonstrates that the EPI Cluster Survey based upon quota sampling at the second stage of sample selection is considerably more prone to sampling bias than conventional cluster sampling, particularly where immunized children are 'pocketed' within clusters. "

"Finally, there is the issue of how second stage sample selection should proceed in surveys with multiple measurement objectives."



## Annex C

### EPI Coverage Survey in Sirajganj Municipality

#### List of selected clusters identified for the survey

Mouza Name	Population	Cluster Number
Mashim pur	4423	1,2
Mohammed pur	3037	3
Raipur	4183	4
Shaya Dangara (Part-1)	4691	5
Darga Road	998	6
Dear Dangara	2991	7
Sekh Mojib Road (Bazar)	1482	8
Gonja Bhanga bari	2550	9
Nutun Bhanga bari	1871	10
Rahamat ganj	2023	11
Shaya Dangara (Part-2)	4202	12
Shaya Gobinda	4752	13
Bahir gola / Marwari Patti	756	14
Datta Bari	2591	15
Jahan pur	3880	16
Kob das para	1561	17
Ek dala	4856	18
Goyla (Part-2)	2599	19
Goyla Amla para (Kali bari)	2986	20
Sher-e-bangla road	1945	21
Dhan bandi	8737	22,23
Hossain pur	5793	24,25
Char malsha para	1391	26
Char Roy pur	3121	27
Mirpur	3062	28
Mirpur Dakshin Gram	1744	29
Mirpur Uttar Gram	2406	30

**Annex D**

**EPI Coverage Survey in Sirajganj Municipality  
List of never vaccinated children by cluster**

Mouza Name	Population	Cluster Number	Never Vaccinated Children
Mashim pur	4423	1,2	-
Mohammed pur	3037	3	-
Raipur	4183	4	-
Shaya Dangara (Part-1)	4691	5	1
Darga Road	998	6	1
Dear Dangara	2991	7	-
Sekh Mojib Road (Bazar)	1482	8	-
Gonja Bhanga bari	2550	9	-
Nutun Bhanga bari	1871	10	2
Rahamat ganj	2023	11	-
Shaya Dangara (Part-2)	4202	12	-
Shaya Gobinda	4752	13	-
Bahir gola / Marwari Patti	756	14	-
Datta Bari	2591	15	2
Jahan pur	3880	16	-
Kob das para	1561	17	4
Ek dala	4856	18	2
Goyla (Part-2)	2599	19	-
Goyla Amla para (Kali bari)	2986	20	-
Sher-e-bangla road	1945	21	-
Dhan bandi	8737	22,23	1,3
Hossain pur	5793	24,25	1
Char malsha para	1391	26	4
Char Roy pur	3121	27	1
Mirpur	3062	28	-
Mirpur Dakshin Gram	1744	29	-
Mirpur Uttar Gram	2406	30	3
		<b>Total</b>	<b>25</b>

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